A REVIEW OF THE GENUS RHIPIDOTHRIPS UZEL

(Thysanoptera: Aeolothripidae)

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This genus of thrips has been considered chiefly European. Recent findings of two species in California (Bailey and Cott, 1952) and Oregon, however, have added it to our North American fauna. Therefore, *Rhipidothrips* becomes a part of our series of reviews of the thrysanopterous genera. Since it is such a small group we have included all known species.

In addition to the species given in the key below, several other thrips have been assigned to the genus *Rhipidothrips*. The Australian species *aureus*, described by Moulton, 1935, has been studied and found to belong in a new, yet undescribed genus related to *Desmothrips*. *R. turneri* Moulton, 1930, was made the type of the new genus, *Rhipidothripiella*, by Bagnall in 1932. In turn, Bagnall's species *uzelianus* is now synonymized with *gratiosus* Uzel.

Acknowledgments are very much in order as we are indebted to H. Priesner and J. D. Hood for the loan of valuable specimens. Without this considered cooperation such reviews in the Thysanoptera are nearly impossible. In addition, we wish to thank E. S. Ross of the California Academy of Sciences for making the Moulton collection available.

Genus RHIPIDOTHRIPS Uzel, 1895

Head longer than wide, slightly produced beyond eyes, broadly attached to thorax. Compound eyes prolonged ventrally. Ocelli present. Maxillary palpi 3-segmented. Labial palpi 4-segmented. Antennae 9-segmented, the terminal three segments fused, the third long; segments III and IV with ventral clear lense-shaped sensory areas at distal position, sometimes nearly forming a band around the segment. *Pronotum* wider than long with lateral suture at each side along the long axis of the body. Bristles weak at anterior margin usually with one longer than others at each posterior lateral angle and two or more pairs along posterior margin. Fore tarsus with hook and a strong spine at distal end of fore tibiae. *Wings* broad and rounded; fore wings with typical aeolothripid veination with the exception of vestigial crossveins in the posterior portion; brachypterous forms with reduced veination (fig. 10). *Abdomen* broadly joined to thorax, tapering sharply at posterior, ovipositor up-curved. Terminal segments of male without claspers, heavy spines or chitinized projections (fig. 2).

Genotype: *Rhipidothrips gratiosus* Uzel, 1895. By monotypy. See also Priesner, 1949, p. 147.

This genus belongs in the group aeolothripini and har the rare genra *Arhipidothrips* Bagnall, 1932 (Faure, 1941) and *Rhipidothripiella* Bagnall, 1932, as its relatives. Other members of this group are *Euceratothrips* Hood, 1936, *Lamprothrips* Moulton, 1935, *Pseudaeolothrips* Bagnall, 1932, and the very large, world-wide genus *Aeolothrips*. Aside from this last-mentioned genus, extremely few specimens have ever been taken and, at present, it is impossible to evaluate the group as a whole. We believe the members of the genus to be predaceous (see also Bagnall and John, 1935), feeding on the larvae of other thrips as *Anaphothrips, Chirothrips, Limothrips,* etc. *Rhipidothrips* appear to reach the peak of seasonal abundance at the time the larvae of the above mentioned genera are most numerous on grains and grasses.

KEY TO THE SPECIES OF RHIPIDOTHRIPS

1. Antennal segment II yellow; dorsum of head with a distinct collar of polygonal reticulations at posterior (fig. 4) ..... *gratiosus*
– Antennal segment II brown or grey; dorsum of head transversely striate..2
2. Forewing of macropterous forms with a brown cross-band; abdominal segments IV and V white; antennal segment IV white ..... *cinctus*
– Forewing without cross-bands; abdominal segments otherwise colored or uniform brown; antennal segment IV pale yellowish brown to dark brown 3
3. Large species, body length 2.5 mm.; length of antennal segment III .087 mm., VIII .008 mm.; tip of antennal segment III dark brown ....*kellyanus*
– Smaller species, body length about 1.6 mm.; antennal segment III, .064 mm., VIII, .013–.020 mm.; III, yellow 4
4. Bristles behind eyes few, weak; intercollar bristles weak. Transverse striations on dorsum of head uniform, one line heavier than remainder, giving the appearance of a posterior collar (fig. 3).....*niveipennis*
– Cluster of short stout bristles behind eyes, intercollar bristles strong; striations on dorsum of head forming a collar-like appearance at posterior (condition unknown in *cahirensis);* remainder of surface weakly striated (fig. 1) ..... *brunneus* and *cahirensis*

DISCUSSION OF THE SPECIES

RHIPIDOTHRIPS BRUNNEUS Williams

1913. Williams, C. B. Jour. Econ. Biol. 8 (4); 216–218.

1926. Priesner, H. Thys. Eur. Wagner. Vienna. Page 97.

Female (brachypterous). Body dark brown with red subhypodermal pigment which does not extend into the appendages. Distal portions of tibiae and all of tarsi are yellow. Wing stubs (fig. 10) faint smoky grey. Antennal segments are colored as follows: I, dark brown; II, dark brown, shading to yellowish brown at tip; III, yellow; IV, yellow, shading to light brown at tip; V–IX, dark brown. *Head* with cheeks slightly arched and a cluster of short spines on margin posterior to eyes, about as long as wide (fig. 1). Three ocelli placed in a triangle, with one pair of moderately

long bristles placed just outside an imaginary line drawn from anterior ocellus to each posterior one. Anterior ocellus minute. Surface of head faintly cross-striate, heavier along posterior margin forming a collar. Maxillary palpi three-segmented and labial palpi four-segmented. Mouthcone short and blunt. Eyes normal and extending ventrally somewhat beyond the dorsal posterior margin. Sensory areas on antennal segments III and IV are on venter at distal end and are lense-shaped (fig. 5), that on segment IV extending halfway around segment; two simple, slender cones on each of segments V and VI, and one on VII. *Pronotum* slightly wider than long and wider across anterior margin than posterior, with a lateral suture extending two-thirds of its length on each side (fig. 1). One moderately long bristle at each lateral posterior angle approximately at the posterior end of above-mentioned suture; one short bristle at each anterior-lateral margin, directed forward, and two or three pairs along posterior margin. A short irregular line or thickening occurs in the center and very faint cross-striations are evident. Fore legs are short and heavy. The heavy claw, typical of the family, is present on the fore tarsus and at the tip of the tibiae are two heavy spines on the interior, one being more in the nature of a spur. The ovipositor is up-curved and no other distinguishing characteristics appear on the abdomen.

Female (macropterous). Our study is based on only one California macropterous specimen. This form is slightly larger than the brachypterous forms, and the setae are somewhat darker and longer. The short, thick bristles behind the eyes and on the lateral margin of cheeks are present. The reticulations on the head and pronotum and general coloration do not vary significantly. For comparison with *niveipennis* particularly, we give the measurements (mm.): head, length, 0.202, width, 0.190; interocellar bristles, 0.035–0.038; pronotum, length, 0.175. width, 0.297; bristles at posterior lateral margins of pronotum, 0.044–0.048; forewing, length, 0.981, width at center, 0.135; antennal segments, length I, 0.035; II, 0.051; III, 0.068; IV, 0.064; V, 0.057; VI, 0.048; VII, 0.038; VIII 0.017; IX, 0.009. Total body length, 2.05. Cross veins are absent in the posterior third of the fore wing. The posterior third is colored a smoky brown, producing a faint longitidunal band (fig. 12). Scalon (1931) first mentioned this form which obviously is very rare.

This form is close to *niveipennis* as also pointed out by Speyer. We have compared it with four specimens of the Reuter species (det. by Priesner) and find that in the European specimens the setae are weaker and colorless, the interocellars are 0.019–0.022 mm. long, the posterior lateral pronotals, 0.032–0.041 mm. and the forewing smaller, 0.864 mm. long, 0.094 mm. wide at center. The cluster of short, stout bristles behind the eyes are entirely absent or extremely weak.

Measurements (in millimeters) of brachypterous female: head, length, 0.192, width, 0.198; pronotum, length, 0.148, width (at anterior margin), 0.210; interocellar bristles 0.028, those at posterior lateral angle of pronotum

.041–.043; total body length, 2.01. Anetnnal segments, length, I, 0.032; II, 0.048; III, 0.064; IV, 0.051; V, 0.051; VI, 0.041; VII, 0.032; VIII, 0.014; IX, 0.011.

Male – unknown.

Material studied: Sussex, England, two females; Albany, Oregon, three females; Granger, Oregon, five females; Corvallis, Oregon, 14 females (Moulton, 1939); Vacaville, Fairfield, Skaggs Island, and Palo Alto California, 43 brachypterous females, and one macropterous female from Skaggs Island.

Hosts: Grasses, oats, *Osmaronia.*

Distribution: England, Siberia, Austria, France, North America: Oregon, California. The California records are new.

RHIPIDOTHRIPS CAHIRESIS Priesner

1932. Priesner, H. Bul. Soc. Roy. Ent. Egypt 25:45-46.

It has not been possible to study either of the two brachypterous females on which this species was based. Comparing the description with *brunneus* to which it is very closely related, we find the principal difference to be that Priesner's species is larger, and has longer antennae. When a longer series is available from this part of the world for comparison with brachypterous forms of *brunneus,* it will be possible to more properly evaluate *cahirensis.* In the meantime it must be keyed out with *brunneus.*

This species was based on specimens taken on "grasses on March 27, 1930, near the Pyramids at a canal bank on the Sakkara road, in Giza Province."

RHIPIDOTHRIPS CINCTUS Hood

1918. Hood. Mem. Queensld. Mus. 6:121-122.

This species is known apparently only from the two original females. It is readily distinguishable from all others described up to the present time by the cross-band on the forewing and the bicolorus abdomen. The important recognition characters appear to be as follows: Antennal segments III and IV and abdominal segments IV and V nearly white; pronotum smooth; maxillary palpi three-segmented; macropterous, forewing with brown cross-band in distal third, apex brown. The describer gave the length of the nine antennal segments in microns as follows: 30, 48, 83, 72, 45, 31, 33, 20, 15; total 0.377 mm.

As far as we know the species has not been taken since its original collection at Cooktown, North Queensland, February 4 and 24, 1912, sweeping, by A. A. Girault. Mr. George Mack,

director of the Queensland Museum states that no types are on deposit at that institution. We have not seen the species.

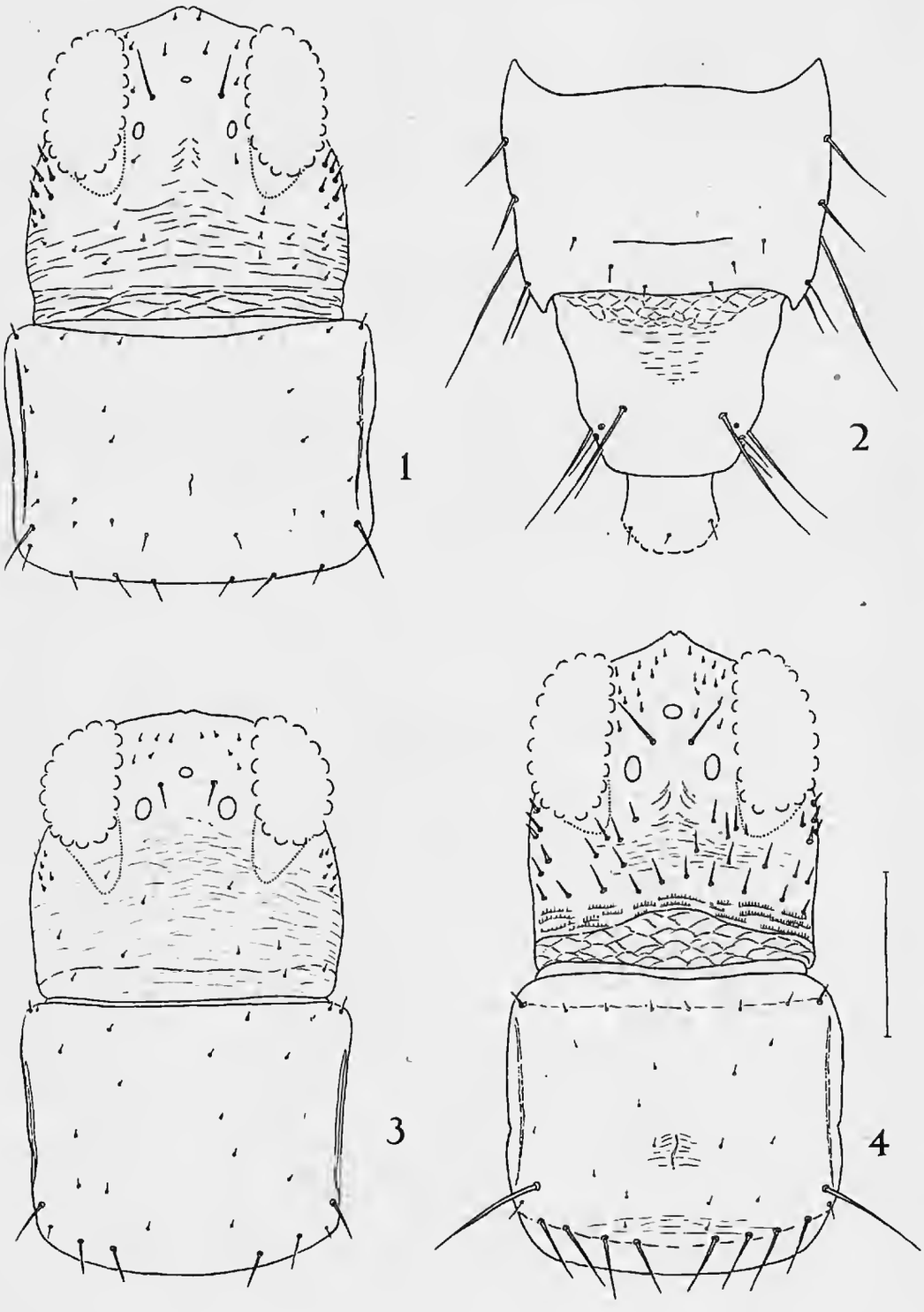
RHIPIDOTHRIPS GRATIOSUS Uzel

1895. Uzel, H. Mongr. Ord. Thys. Koniggratz. Pages 66–68, figs. 42–43.
1926. Priesner, H. Thys. Eur. Wagner. Vienna. Page 96.

Female (macropterous). Body light brown, protonum yellow with an irregular "x"-marking of brown in center, head dark brown. Tarsi all yellow, distal and basal portion of tibiae yellow, as well as basal portion of femora. Wings light grey with a smoky brown band longitudinally along posterior fourth of forewing. Antennal segments colored as follows: I, dark brown, II, yellow with dark brown ring at base, III, brownish yellow, dark at tip, IV, smoky brown with dark ring at tip, V–IX, dark brown. Sensory areas on segments III and IV extending two-thirds around segment (fig. 6). *Head* longer than wide, cheeks slightly curved outwards with 3-4 moderately heavy britsles at lateral margins behind eyes. Three ocelli present, normal, with one pair of long seta (.038 mm. in length) on a line with or within an imaginary line drawn between the anterior ocellus and each postcrior one. Eyes normal, not enlarged, but extending somewhat posteriorly beyond the hind dorsal margin. Minor setae longer and more numerous on head than on *brunneus*. Reticulations heavy and particularly prominent on posterior portion of head thus forming a "collar." Microtrichia present, directed forward, on reticulations immediately anterior to collar. Maxillary palpi three-segmented and labial palpi four-segmented (figs. 8, 9). Sensory areas on antennal segments III and IV of the same type and similarly placed as on *brunneus* but larger, in addition two or three faint circular areas are present on the venter; those on the remaining segments are as in *brunneus*. *Pronotum* wider than long. One small seta at each anterior lateral angle and a scattered row of somewhat shorter setae along anterior margin. One long seta (.064–.075 mm. in length) on lateral margin slightly forward of posterior laterial angle and three or four pair of shorter bristles evenly spaced, along posterior margin. The remainder of pronotum with scattered, irregularly spaced, minor setae. Striations appear weakly at the center and posterior margin. The lateral suture, so prominent in *brunneus*, is very faint in *gratiosus* but the small mid-dorsal line is present. Fore legs normal with a heavy tarsal hook on the underside, directed inward (fig. 11). Tibial "spurs" as in *brunneus* but somewhat less strongly developed. *Wings* as in *brunneus* (macropterous form) but slightly longer. Ovipositor normal.

Measurements (mm.) of female: head, length, 0.195, width, 0.174; pronotum, length, 0.131, width, 0.198; forewing, length, 0.891, width (at center), 0.135; total body length (distended), 1.94. Antennal segments, length, I, 0.013; II, 0.210; III, 0.090; IV, 0.067; V, 0.054; VI, 0.044; VII, 0.035; VIII, 0.012; IX, 0.009.

Male. Bagnall (1913) and Morison (1948) record males from England. Uzel, in his original description, stated that the male was smaller and more slender than the female, similarly colored and the dorsum of the first abdominal segment with the usual two ridges present. We have studied seven males and note no claspers or thorns or dimorphism in the antenna.

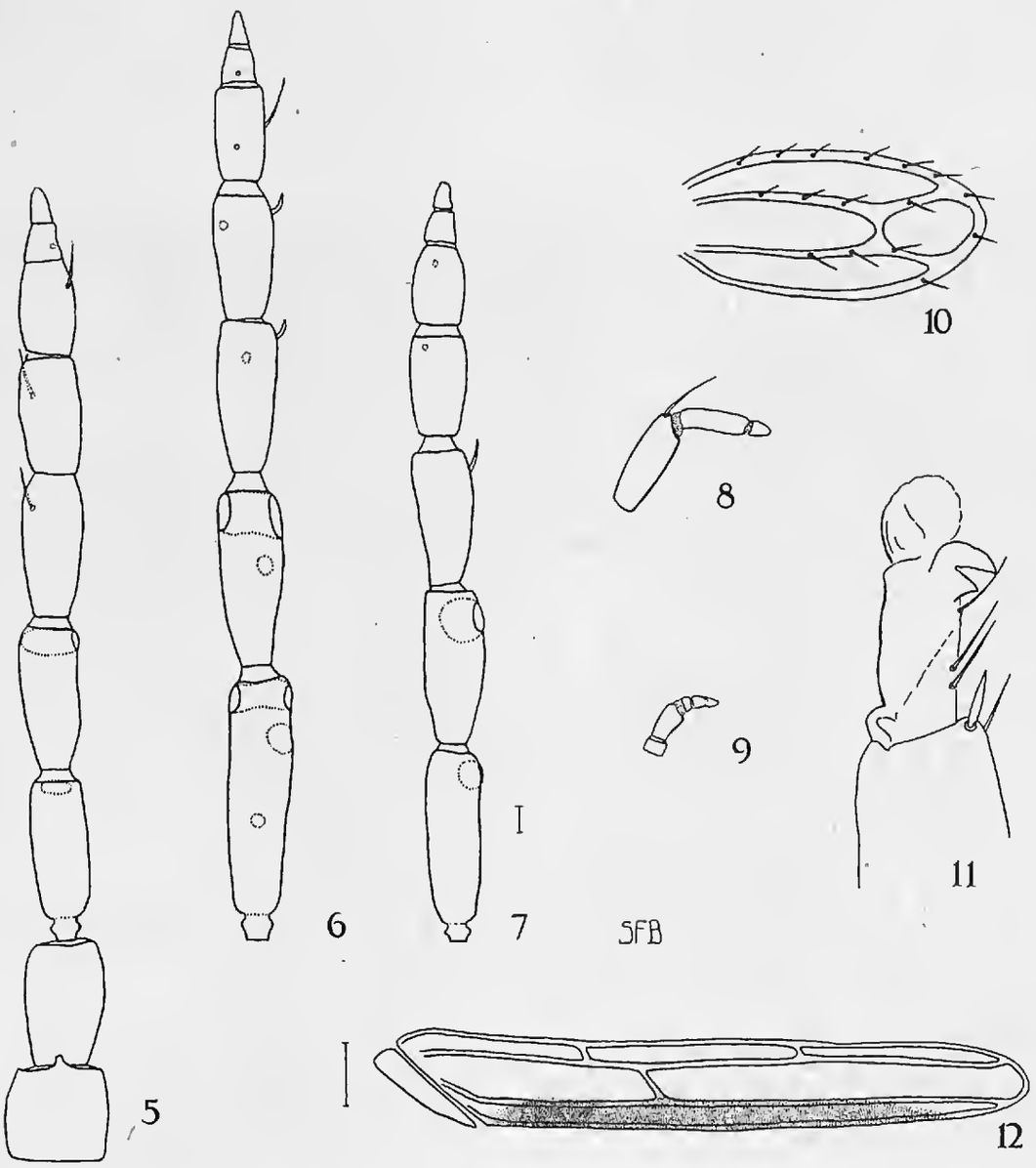


EXPLANATION OF FIGURES

Fig. 1. Head and pronotum of *Rhipidothrips brunneus* Wms. Fig. 2. Terminal abdominal segments of *Rhipidothrips gratiosus* Uzel, male. Fig. 3. Head and pronotum of *Rhipidothrips niveipennis* O. M. Reuter. Fig. 4. Head and pronotum of *Rhipidothrips gratiosus* Uzel. Fig. 5. Antenna of *Rhipido-*

To our knowledge there are no micropterous, brachypterous, or apterous forms of this species.

Material studied: Cyprus, 1 female: Switzerland, 1 female; France, 5 females, 5 males; Austria, 7 females, 2 males; North America, California, 24 females.



thrips brunneus Wms. Fig. 6. Antenna of *Rhipidothrips gratiosus* Uzel. Fig. 7. Antenna of *Rhipidothrips niveipennis* O. M. Reuter. Fig. 8. Maxillary palpus of *Rhipidothrips gratiosus* Uzel. Fig. 9. Labial palpus of *Rhipidothrips gratiosus* Uzel. Fig. 10. Fore wing pad of *Rhipidothrips brunneus* Wms. Fig. 11. Fore tarsus and tip of tibia of *Rhipidothrips gratiosus* Uzel. Fig. 12. Fore wing of macropterous form of *Rhipidothrips brunneus* Wms. Scale: figs. 1, 3, 4, 10, 12, line equals 0.1 mm.; figs. 2, 5, 6, 7, 8, 9, 11, line equals 0.01 mm.

Hosts: Barley, oats, wild grasses, "flowering Dicotyledons", *Coronilla varia.*

Distribution: England, France, Bohemia, Hungary, Austria, Switzerland, Cyprus.

New records: North America; California, near Beaumont, June 6, 1949, R. M. Bohart; San Luis Obispo, Pismo Beach, and Zaca Mt., April 24, 1951, S. F. Bailey and R. M. Bohart. These are the first records of the species in North America.

RHIPIDOTHRIPS KELLYANAS Bagnall

1924b. Bagnall, R. S. Ann. Mag. Nat. Hist., ser. 9, 13:584-585.

Bagnall based this Australian species on two females, which from the description, is distinctly different from *cinctus*. The coloration of the forewings is typical of European species and the reticulated collar and the mottling on the head remind one of *gratiosus*. The peculiar shortening of the eighth antennal segment is a unique character but since this measurement is based on only one perfect specimen, it is impossible to say whether or not this is reliable. The writer recalls discussing this trips with the late Dudley Moulton and he was of the opinion it did not belong in *Rhipidothrips*. Nothing further can be done with this species at present.

The two females were collected on April 22, 1923, on *Eucalyptus leucoxylon* by R. Kelly, Mount Lofty Ranges, South Australia. Supposedly the slide is in the Bagnall collection in the British Museum, London, England.

RHIPIDOTHRIPS NIVEIPENNIS O. M. Reuter

1899. Reuter, O. M. Act. Soc. Faun. Flor. Fenn. 17(2):30-31.

1926. Priesner, H. Thys. Eur. Wagner. Vienna. Pages 96-97.

Female (macropterous). Body dark brown with red subhypodermal pigment. Distal portions of tibiae and all tarsi yellowish white. Wings normal, nearly colorless, faintly yellowish brown near base of forewings and along costal vein. Antennal segments colored as follows: I and II dark brown, III and IV yellow, V brownish yellow, VI–IX brown. Head with cheeks nearly straight with very weak spines, slightly longer than wide (fig. 3). Three ocelli, anterior one smaller than laterals; surface completely cross-striate, the lines anastomosing. Compound eyes prolonged ventrally; inter-ocellar bristles short. Maxillary palpi three-segmented; labial palpi four-segmented. Mouthcone extending slightly beyond the center of the prothorax. Sensory areas on antenna ventral, oval, that on IV larger than on III, placed near tip; two small simple cones on each of segments V–VII (fig. 7).

Pronotum slightly wider than long; lateral suture present; surface lightly cross-striate; one moderately heavy bristle at posterior lateral angles. One pair on posterior margin at each side of center, one short seta at each

anterior lateral angle, directed forward. Fore legs normal, with claw on basal tarsal segment and a spur at tip of tibia. Abdomen typically aeolothripoid in shape, ovipositor up-curved.

Measurements (in millimeters); head, length, .041, width, 0.38; pronotum, length .160, width, .166; total body length, 1.33. Antennal segments (length): I,.028; II, .041; III, .072; IV, .057; V, .054; VI, .040; VII, .030; VIII, .013; IX, .008.

Male: not available for study; very rare.

Material studied: Three females (loaned from Hood collection) det. H. Priesner, coll. Ahlberg. Sweden, Experiment alfältet, May 30, 1919. Host unknown (probably grasses). One female collected by Hukkinen, det. zy Priesner with no locality data.

Hosts: Grasses, *Abies, Rubus, Galium, Solidago, Convallaria, Taraxacum, Anthriscus, Urtica, Hieracium,* and *Alopecurus.*

Distribution: Sweden, Finland.

Hukkinen (1935, 1942) reports both macropterous and brachypterous forms from Finland. Speyer and Parr (1951) report studying one of Hukkinen's specimens which lacks the posterior lateral bristles on the pronotum, thus agreeing with the original description. The specimens we have studied all have setae on the pronotum as shown in fig. 3. Neither of the above authors (or Williams, 1916) mention other important diagnostic characters such as post-ocular and interocellar setae as well as the nature and extent of the dorsal reticulations on head and pronotum. Speyer points out that Reuter may have had two species before him, one of which is what we now believe to be the macropterous form of *brunneus*. However, we note differences in the two forms of *brunneus* and also point out that the brachyterous form (Hukkinen, 1935, 1942) of *niveipennis* has not been fully described.

Some years thrips are known to produce many winged forms and the following season they will be scarce. Not until a large series of the two forms of these two species are collected and studied can this matter be definitely settled. When only a few specimens are available, it is possible that the individuals studied by both Reuter and Speyer are atypical.

RHIPIDOTHRIPS UZELIANUS Bagnall

1934. Bagnall, R. S. Ann. Mag. Nat. Hist., ser. 10, 14:482.

This enigmatic species from Switzerland has not been clearly defined and has to our knowledge not been taken since Bagnall described it. The author distinguished it from *gratiosus* solely on minor differences in the size of the wings ,head, tibiae, and shorter

intermediate antennal segments. We have not seen this species but consider it of very doubtful validity. The only significant difference in the measurements given by Bagnall is in the length of antennal segment IV; that of *gratiosus* being given as 80 microns and that of *uzelianus* as 59. In a series of 25 female *gratiosus* which we have studied the length of this segment varies from 57 to 80, averaging 71.5 microns.

Morison (1948) lists this species from England, quoting Bagnall, but apparently did not collect it himself or critically study Bagnall's material.

In our collection we have one female of *gratiosus* taken and determined by Bagnall at Zurich, Switzerland, with the same collection data as the unique specimen of *uzelianus* with the exception of the host being "oats" instead of "*Brachypodium*". It is a typical specimen of *gratiosus* with antennal segments of the following lengths: 28, 48, 99, 80, 57, 48, 35, 16, 11. Nothing further can be done to more definitely place this species until the type is studied and more material collected.*

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* Since this paper was prepared, E. R. Speyer has called my attention to his report of 1951 (Speyer and Parr, 1951) in which he has studied the type and already synonymized it with **gratiosus.**

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USE OF BIRD NEST BY BUMBLEBEE

A nest of a bumblebee, *Bombus caliginosus* (Frison), was found on May 1, 1954, in Berkeley, California in an old nest made by house finches [*Carpodacus mexicanus* (Müller)] in 1953 or possibly 1952. The nest was placed about 15 feet above the ground against the redwood siding of a house and was supported by twigs of a broad-leaved ornamental shrub on the northeast side of the house. When found, the bird nest was occupied by a queen bee and contained a number of recently formed brood cells and a pollen mass within which were present six larvae, three pupae, and two egg masses of 9 and 10 eggs, respectively. Also present was a small lepidopterous larva *Hofmannophila pseudospretella* (Staint.)[1]. A new brood cell contained mites of the family Laelaptidae[2] of the genus *Hypoaspis (s.l.)*.

The nest chamber of the bee was within the soft, collapsed mass of bird nest material which was originally the lining. This consisted of thin fibers, chiefly grass, and many small wads of cottony and downy material apparently collected from plants such as willows and from *Eucalyptus* flower-heads. The entrance to the bee's nest chamber was on top of the bird nest and led to a main chamber an inch from the surface occupied by the pollen mass. The new cell was inserted into another part of the nest and was connected with the main passage in front of the pollen mass. The bird nest was protected from rain by both the supporting shrub and a roof overhang.

The over-winter use of a bird nest by *Bombus* is apparently unrecorded, hence this note.—FRANK A. PITELKA, *Museum of Vertebrate Zoology, University of California, Berkeley.*

[1] Identified by H. W. Capps
[2] Identified by D. P. Furman